

What is claimed is:

1. A hard-drawn steel wire for spring excellent in fatigue strength and sag resistance containing:

C: 0.5-0.7mass% (hereinafter, referred to as %),

Si: 1.0-1.95%,

Mn: 0.5-1.5%, and

Cr: 0.5-1.5%,

the balance being essentially Fe and inevitable impurities,

and containing 5 particles/ $100\mu\text{m}^2$  or less of carbides whose circle-equivalent diameters are 0.1  $\mu\text{m}$  or more.

2. A steel wire according to claim 1, which further contains 0.05-0.5% of Ni.

3. A steel wire according to claim 1 or 2, which further contains 0.3% or less (excluding 0%) of Mo.

4. A hard-drawn spring excellent in fatigue strength and sag resistance, which is produced by coiling the steel wire according to any of claims 1 to 3.

5. A hard-drawn spring according to claim 4, wherein a difference derived by subtracting ( $R_-$ ) from ( $R_+$ ) is 500 MPa or less,

where ( $R_+$ ) is a residual stress on an inner surface of said spring, and ( $R_-$ ) is a residual stress on an outer surface of said spring.

6. A hard-drawn spring according to claim 5, wherein the surface is subjected to a shot peening treatment two times or more.

7. A hard-drawn spring according to claim 6, wherein a difference derived by subtracting ( $R_{s-}$ ) from ( $R_{s+}$ ) is 300 MPa or less,

where ( $R_{s+}$ ) is a residual stress on an inner surface after subjected to said shot peening treatment, and ( $R_{s-}$ ) is a residual stress on an outer surface after subjected to said shot peening treatment.



8. A hard-drawn spring according to claim 4, which has a surface with a maximum roughness height  $R_y$  of  $10\ \mu\text{m}$  or less.
9. A hard-drawn spring according to claim 4, which has a surface subjected to a nitriding treatment.
10. A hard-drawn spring according to claim 4, wherein a ratio of  $D/d$  is 9.0 or less, where  $D$  is a coil diameter of said spring, and  $d$  is a wire diameter of said spring.